CLAIMS:

1. (Original) A method of detecting motion in nanoscale structures, comprising:

providing a molecular structure having a rotating arm;

attaching a nanoparticle to the rotating arm of the molecular structure so that the nanoparticle rotates with the rotating arm of the molecular structure;

exposing a light to the nanoparticle, wherein a first surface of the nanoparticle scatters a first wavelength of the light when the nanoparticle is in a first position and a second surface of the nanoparticle scatters a second wavelength of the light when the nanoparticle is in a second position; and

filtering the first and second wavelengths of the light through a polarizing filter to detect rotational motion by observing alternating first and second wavelengths of the light.

2. (Original) The method of claim 1, wherein the nanoparticle is rod-shaped.

3. (Original) The method of claim 2, wherein the nanoparticle is a gold nanorod.

4. (Original) The method of claim 1, wherein the first surface of the nanoparticle has greater area than the second surface of the nanoparticle.

5. (Original) The method of claim 4, wherein the first wavelength of the light is longer than the second wavelength of the light.

6. (Original) The method of claim 5, wherein the first wavelength of the light is red light and the second wavelength of the light is green light.

7. (Original) The method of claim 1, wherein the molecular structure is an F1-ATPase enzyme.

8. (Original) The method of claim 1, further including the step of disposing a detection DNA stand between the nanoparticle and the molecular structure, wherein the detection DNA strand hybridizes with a target DNA strand, if the target DNA strand matches the detection DNA strand, to form a structural link between the molecular structure and the nanoparticle.

9. (Original) A method of detecting motion in nanoscale structures, comprising:

attaching a nanoparticle to a rotating portion of a molecular structure;

exposing a light to a first surface of the nanoparticle to scatter a first wavelength of the light;

exposing a light to a second surface of the nanoparticle to scatter a second wavelength of the light; and

filtering the first and second wavelengths of the light to detect the rotational motion by observing the first and second wavelengths of the light.

10. (Original) The method of claim 9, wherein the nanoparticle is rod-shaped.

11. (Original) The method of claim 10, wherein the nanoparticle is a gold nanorod.

12. (Original) The method of claim 9, wherein the first surface of the nanoparticle has greater area than the second surface of the nanoparticle.

13. (Original) The method of claim 12, wherein the first wavelength of the light is longer than the second wavelength of the light.

14. (Original) The method of claim 13, wherein the first wavelength of the light is red light and the second wavelength of the light is green light.

15. (Original) The method of claim 9, wherein the molecular structure is an F1-ATPase enzyme.

16. (Original) The method of claim 9, wherein the step of filtering the first and second wavelengths of the light uses a polarizing filter.

17. (Original) The method of claim 9, wherein the step of further including the step of disposing a detection DNA stand between the nanoparticle and the molecular structure, wherein the detection DNA strand hybridizes with a target DNA strand, if the target DNA strand matches the detection DNA strand, to form a structural link between the molecular structure and the nanoparticle.

18. (Withdrawn) A method of detecting a substance, comprising:

attaching a detection DNA stand between a nanoparticle and a rotating portion of a molecular structure;

hybridizing a target DNA strand corresponding to the substance to be detected to the detection DNA strand if the target DNA strand matches the detection DNA strand to form a structural link between the nanoparticle and the molecular structure;

exposing a light to a first surface of the nanoparticle to scatter a first wavelength of the light;

exposing a light to a second surface of the nanoparticle to scatter a second wavelength of the light;

filtering the first and second wavelengths of the light; and

detecting presence of the substance upon observing alternating first and second wavelengths of the filtered light.

19. (Withdrawn) The method of claim 18, wherein the nanoparticle is rod-shaped.

20. (Withdrawn) The method of claim 19, wherein the nanoparticle is a gold nanorod.

21. (Withdrawn) The method of claim 18, wherein the first surface of the nanoparticle has greater area than the second surface of the nanoparticle.

22. (Withdrawn) The method of claim 21, wherein the first wavelength of the light is longer than the second wavelength of the light.

23. (Withdrawn) The method of claim 22, wherein the first wavelength of the light is red light and the second wavelength of the light is green light.

24. (Withdrawn) The method of claim 18, wherein the step of filtering the first and second wavelengths of the light uses a polarizing filter.

25. (Withdrawn) The method of claim 18, wherein the molecular structure is an F1-ATPase enzyme.

26. (Original) A method of detecting motion, comprising:

attaching an anisotropic particle to a rotating portion of a base structure;

exposing a light to the anisotropic particle to scatter first and second wavelengths of the light; and

filtering the first and second wavelengths of the light to detect the rotation motion by observing the first and second wavelengths of the light.

27. (Original) The method of claim 26, wherein the anisotropic particle is rod-shaped.

28. (Original) The method of claim 27, wherein the anisotropic particle is a gold nanorod.

29. (Original) The method of claim 26, wherein the first surface of the anisotropic particle has greater area than the second surface of the anisotropic particle.

30. (Original) The method of claim 29, wherein the first wavelength of the light is longer than the second wavelength of the light.

31. (Original) The method of claim 30, wherein the first wavelength of the light is red light and the second wavelength of the light is green light.

32. (Original) The method of claim 26, wherein the base structure is an F1-ATPase enzyme.

33. (Withdrawn) A nanoscale motion detector, comprising:

a molecular structure having a rotating portion;

a nanoparticle coupled to the rotating portion of the molecular structure;

a light source incident to a first surface of the nanoparticle to scatter a first wavelength of the light when the nanoparticle is in a first position and further incident to a second surface of the nanoparticle to scatter a second wavelength of the light when the nanoparticle is in a second position; and

a polarizing filter filters the first and second wavelengths of the light, wherein rotation motion is detected by observing first and second wavelengths of the filtered light.

34. (Withdrawn) The nanoscale motion detector of claim 33, wherein the nanoparticle is rod-shaped.

35. (Withdrawn) The nanoscale motion detector of claim 34, wherein the nanoparticle is a gold nanorod.

36. (Withdrawn) The nanoscale motion detector of claim 33, wherein the molecular structure is an F1-ATPase enzyme.

37. (Withdrawn) The nanoscale motion detector of claim 33, further including a detection DNA stand coupled between the nanoparticle and the molecular structure, wherein the detection DNA strand hybridizes with a target DNA strand, if the target DNA strand matches the detection DNA strand, to form a structural link between the molecular structure and the nanoparticle.